



INDIANA FOREST HEALTH HIGHLIGHTS 2002



THE FOREST RESOURCES

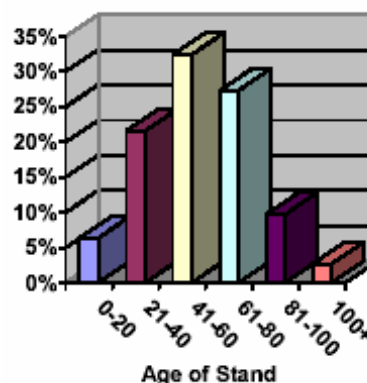
Indiana is a national leader in hardwood lumber production. The forest products industry adds over \$4 billion to the state's economy each year. To support this industry, Indiana forestland contains a total of 7.8 billion cubic feet of live volume or 1,750 cubic feet per forestland acre. Of this volume, 6.71 billion cubic feet, or 87% of the live volume, is growing stock volume (solid wood on timberland in commercial trees >5 inches diameter)¹.

Between 1967 and 2000, Hoosier timberland increased nearly 300,000 acres from 3.90 million to 4.29 million acres.

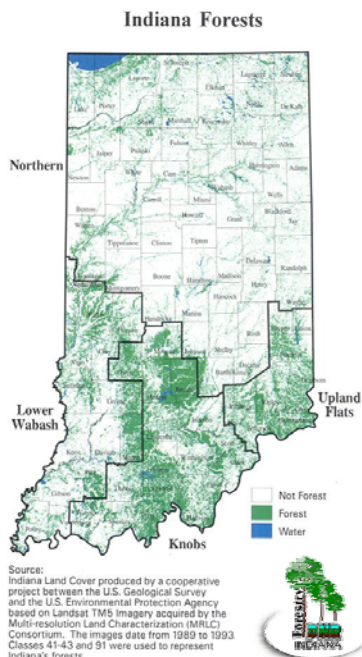
INDIANA FOREST STATISTICS	
Total acres	22,957,400
Forested acres	4,415,400
Timberland acres	4,289,200
Percent forested - all land	19.2%
Percent timberland - all land	18.7%
Percent timberland - forest land	97.0%
Reserved acres 159,100 or 3.6% of forest land	

The growing stock volume also increased 84% (3.65 billion to 6.71 billion cubic feet). On timberland in 2000, growing stock volume averaged 1,560 cubic feet, more than double the 680 cubic feet in reported in 1950³. Thus, Indiana forests through the care, interest and management of their landowners continues to grow and produce approximately 2½ times the volume being removed¹.

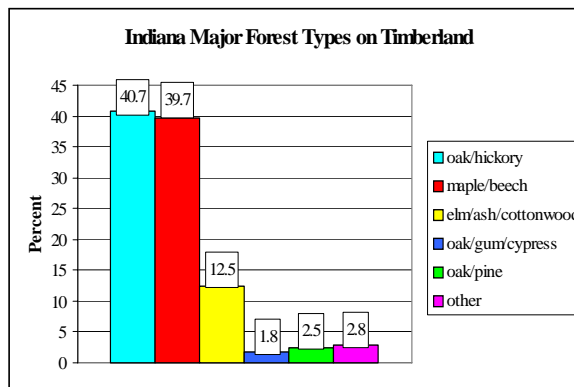
This increase in growth of the forest has created a monoculture of old/mature stands that are at greater risk to mortality from insect epidemics (such as the looper complex, forest tent caterpillar and in the near future gypsy moth) and drought. In 1950, 51% of the timberland was in large-diameter size class. By 1998² and 2000³, this increased to 70%. In the oak/hickory forest type, 82% of the stands were considered large diameter¹. Fully 23% of growing stock volume in 2000 was in trees with diameters greater than 21 inches in diameter.



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By species/genus in 2000, oak growing stock volume was 28%, hickory 12%, yellow poplar 12%, maple 12%, ash 7%, conifers 4% and all other species below 3.5%¹.



EXOTICS

GYPSY MOTH - SLOW THE SPREAD SUCCESSFUL

The number of male moths detected and the location of positive traps in 2002 continue to demonstrate the successful use of the Slow-The-Spread (STS) protocol. Based on the 10-moth line, Indiana's STS Program held gypsy moth's advance in check and moved the spread backward toward Michigan (Figure 1).

The 2002 Cooperative Statewide Gypsy Moth Survey completed its sixteenth year of the statewide survey and fifth year of using Slow-The-Spread (STS) protocol for the design and operation of the survey. The survey is designed on a kilometer based grid system and set 2,195 intensive and 13,968 detection traps all referenced by GPS. The 15,569 moths detected came from 37 counties, ranging from 1 to 6,034 moths per county (Figure 2). The moths detected were an increase from 2000 (5,881 moths) and similar to the number of moths caught in 1999 and 2000, but less than the 81,995 moths detected in 1998 (Figure 2). Since the beginning of gypsy moth surveying in Indiana in 1972, 218,668 moths have been caught in 89 of the 92 counties. No new county records were detected in 2002.

As in prior years, the detection survey found gypsy moth primarily confined to the 'Evaluation Area' and to the northern boundary of the 'Action Area' of the STS program area (Figure 2 & 3). The 'Evaluation Area', which is the quarantined northeastern counties of Steuben, DeKalb, LaGrange, Noble and Allen, detected 9,018 of the 15,569 moths. The northern third of the state falls in the 'Action Area', which is below the 'Evaluation Area'. The 'Action Area' detected 6,507 of the 15,569 moths. The 'State Area', which is the remainder of the state, detected 27 moths, mostly from southeastern Indiana. Moth catch in the 'State Area' was primarily 1 to 2 moth traps except for one six-moth trap in Scott County, and was a slight decrease in the detection of scattered low count moth traps compared to the 2001 survey. The moth catch pattern in southeastern Indiana continues to

Figure 1. The gypsy moth 10-moth line in Indiana from 1998 to 2002.

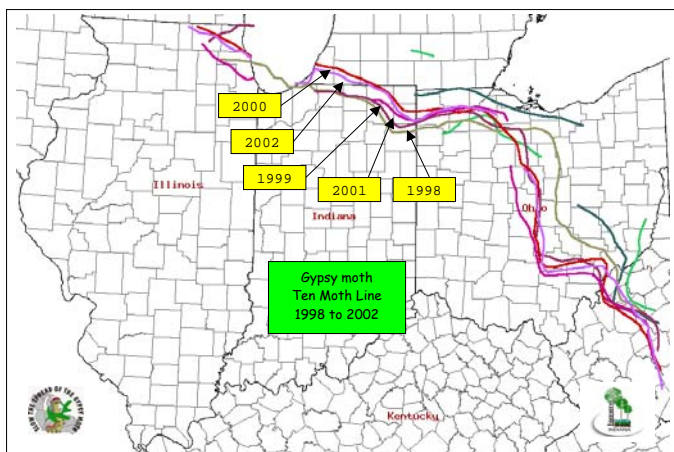


Figure 2 State of Indiana 2002 Gypsy Moth Data moths per county

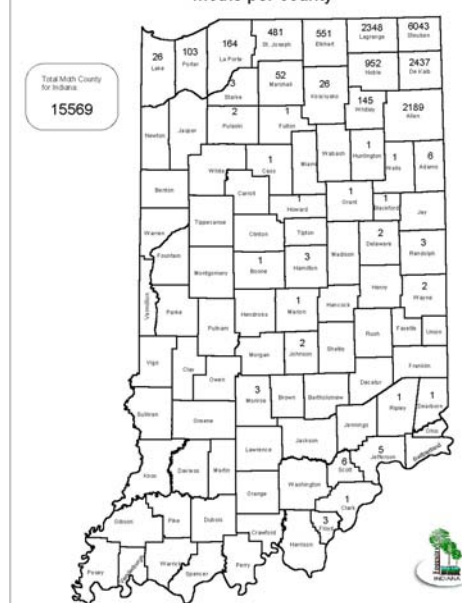


Figure 3. Gypsy Moth 2002 trapping zones - evaluation, action and state.

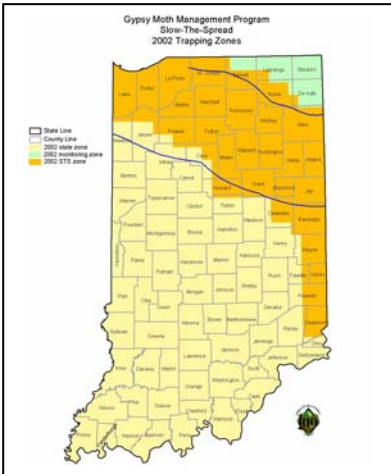
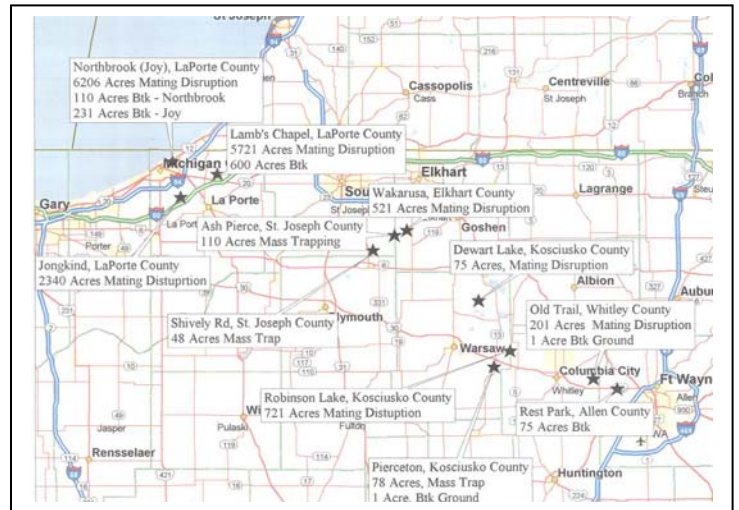
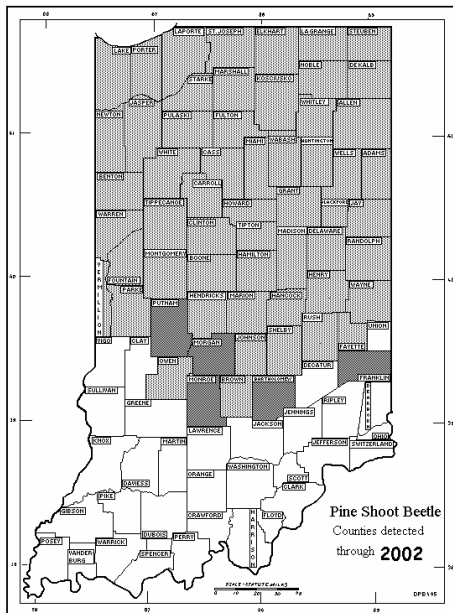


Figure 4. 2002 treatment sites.



indicate that gypsy moth is beginning to move into this area of the state from Ohio.

An aerial defoliation survey of the five northeastern counties in the Evaluation Zone and four northern counties with treatment sites in the Action Zone did not detect defoliation. Defoliation of individual trees in the Evaluation Zone was recognized from ground surveys, however this defoliation was not heavy enough to be noticed from the air.



The number of treatment sites increased in 2002 to fifteen sites compared to 2001 (6 sites) and was similar to the number treated in 2000 (14 sites) (Figure 4). Three sites totaling 906 acres were treated with two applications of Btk at 30 BIU/acre/application. Five sites totaling 13,380 acres and two sites totaling 2,274 acres in four counties received one application of pheromone flakes for mating disruption at 6 and 15 grams, respectively, in June. Mass trapping was preformed on three sites with 151 traps set and 202 total moths catch. Btk was applied from the ground on three sites. This was done to supplement pheromone flakes and mass trapping efforts. Delimit surveys to monitor success of the Btk and mating disruption treatments did not detect moths within the treatment boundaries.

PINE SHOOT BEETLE

The distribution of Pine Shoot Beetle, *Tomicus piniperda*, added 5 new counties to the quarantine area in 2002– Bartholomew, Franklin, Monroe, Morgan and Putnam. This is still a regulatory pest and not considered a serious threat to the health of the pine forests of the state.

SIREX WOODWASP

Sirex woodwasp, *Sirex noctilio*, was intercepted in a factory in Bloomington (Monroe County) from pallets with machinery from Spain. Although no other life stages were found, delimit surveys are planned for 2003 because there is a large pine resource within a 50-mile radius of Bloomington. A pest of pines and native to Asia, sirex woodwasp is a threat to pine resource of Indiana and the U.S.

HARDWOOD PESTS

EASTERN TENT CATERPILLAR EPIDEMIC CONTINUES



USDA, Forest Service, S&PF

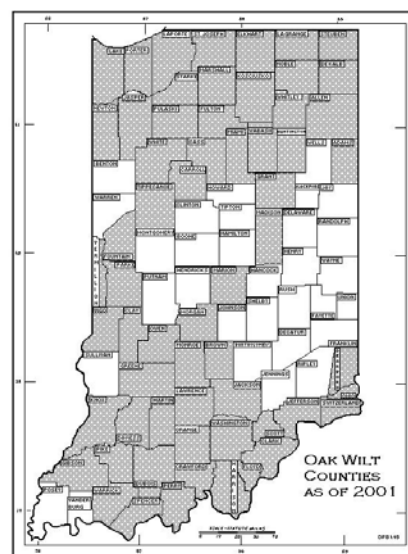
Eastern tent caterpillar, *Malacosoma americanum*, returned for the third consecutive year of defoliation. Present in south central Indiana from Monroe County south to Perry, Crawford and Harrison Counties, black cherry trees were heavily defoliated. As in 2000 and 2001, black cherry in fencerows and in the forest were defoliated. Usually observed on small fencerow and edge trees in the woods, the epidemic continued to attack large fencerow and sawtimber size trees in the forest. The epidemic is expected to decrease or stop in 2003.

OAK WILT

Oak wilt, *Ceratocystis fagacearum*, has been confirmed from 62 of the 92 counties since first reported in 1940's. The northwest corner of the state is the active oak wilt area in Indiana. The death of red and black oak from oak wilt is easily seen in the woodlots, wooded subdivision and yard trees in this area of the state. Death of red oaks in the southern part of the state from oak wilt is not as common as it is in northwestern Indiana. In southern Indiana, Armillaria Root Rot and Two-Lined Chestnut Borer are more common in dead oak and the symptoms and signs oak wilt are difficult to find.

ANTHRACNOSE TO SYCAMORE AND OTHER HARDWOODS

The cool wet spring resulted in heavy defoliation of sycamore from anthracnose, *Apiognomonia veneta*. When temperatures average 50 F or less and the average weekly rainfall is 1+”, anthracnose develops and causes severe defoliation to sycamore. When this happens to sycamore,



the trees usually do not develop full size leaves until early July. This also results in twig and branch dieback. And, when anthracnose is severe on sycamore, then anthracnose also develops on oak, maple and ash. This spring across Indiana, anthracnose was reported on sycamore, oak, ash and maple.

LOCUST LEAF MINER

The leaves of black locust turned brown in color again in 2002 from feeding by the leafmining larvae and the adult of Locust Leaf Miner, *Odontata dorsalis*. Black locust in the southern half of the state experienced defoliation, which was more common along the Ohio River. The defoliation weakens the tree and may lead to mortality from the locust borer. The locust borer can build its' population on trees weakened by locust leaf miner defoliation. However, no mortality was reported by the locust borer.

DUTCH ELM DISEASE

Dutch Elm Disease, *Ceratocystis ulmi*, continued to kill elm across Indiana in 2002. Each summer starting in early July, the symptoms of the DED begin to appear in branches of elms. Starting as a yellowing of the foliage that progresses to a red/brown foliage, this symptom can be easily seen in elms across the state. As the summer progresses, the entire tree succumbs to DED. Over the past 10 years, a large percentage of the elm population in Indiana has been killed by DED.

JUMPING OAK GALL



IDNR, Forestry, Forest Health

Jumping Oak Gall was observed in southern Indiana during 2002. One or more species of a Cynipid wasp (*Neuroterus spp.*) for the gall on the underside of the leaves. The gall develops in late May and early June, and if leaves are heavily galled, they turn yellow than brown. Foresters reported occasional observations of the gall. As in the prior two years, the gall did not do any noticeable damage to white oak.

CONIFER PESTS

WHITE PINE ROOT DECLINE

Procera Root Rot (White Pine Root Decline), *Leptographium procerum*, has been noticeably killing white pine across the state for many years. It continues to kill windbreak, yard and plantation trees. The forest health program continues to receive the most requests for assistance for this disease. Landowners from across the state call to ask about the death of their white pine trees and what they can do save the remaining trees.



USDA, Forest Service, S&PF

Trees from 4 to 30 feet tall and 3 to 6 inches in diameter are commonly killed. Trees can turn brown in color at any time of the year, but do so more commonly in the spring and fall. Infected trees appear light green and sparse or thin at first. Then the trees turn brown in a short period of time. Most landowners do not recognize the early symptoms of the disease. They usually see the dead brown tree and sawdust from woodborers that attack the dead tree. Management of the disease is done by using sanitation measures. There is no cure or preventative treatment for the disease.

BAGWORM

Bagworm, *Thyridopteryx ephemeraeformis*, usually defoliates conifers and some hardwoods in southern Indiana each year. However, foresters in northern Indiana reported bagworm defoliation to conifers. The appearance of bagworm in the northern half of the state is believed to be the result of mild winters in recent years. The mild winters have allowed bagworms to survive and develop into populations causing noticeable defoliation.

WEATHER

DROUGHT

The forests of southern Indiana experienced drought. Yellow poplar in the forest or yard had dropped most of its foliage in response to the drought. By August, the yellowing inner foliage of yellow poplar made it easy to outline the distribution of this species in the forest. Sycamore also showed early fall color (yellowing) in August and September because of the drought. This year is an up-and-down year for moisture available to trees. The spring was extremely wet with constant rains occurring through June. Then the moisture was turned off and the heat turned on from July through September. Thus the fine feeding roots of the trees have had a difficult time of going from complete soil saturation and flooding to no moisture down to the subsoil level. The decline of trees in the forest is expected to develop over the coming years.

“FLAGGING” OF ASH BRANCHES

Branches in the crown of ash trees turned brown in color creating a “flagging” symptom during August and September. This symptom appeared similar to cicada injury but without the oviposition wound and branch breakage. Although no cause was determined, it is believed that drought caused the damage to occur.

Sources:

1. Schmidt, T.L., M.H. Hansen, and J.A. Solomakos. 2000. Indiana's Forests in 1998. USDA Forest Service. North Central Research Station. St. Paul, MN
2. Forests of Indiana: A 1998 Overview, USDA, NA-TP-03-00, September 2000.
3. Indiana's Forest Resources in 2000, USDA, FS, NCRS, Resource Bulletin NC-206, 2002.

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